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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/517,555	12/08/2004	Yuichi Nishihara	405507-0030	3859
7590 Lawrence Rosenthal Stroock & Stroock & Lavan 180 Maiden Lane New York, NY 10038		01/09/2008	EXAMINER LEBRON, JANNELLE M	
			ART UNIT 2861	PAPER NUMBER
			MAIL DATE 01/09/2008	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

**Application No.**

10/517,555

**Applicant(s)**

NISHIHARA, YUICHI

**Examiner**

Jannelle M. Lebron

**Art Unit**

2861

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 16 October 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) 5-13 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 December 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
  - 2) ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Tsukada et al. (US 2002/0012015) in view of Takamura et al. (US 6,504,701).

3. Tsukada et al. discloses an expendable container [liquid container 1] capable of measuring a residual quantity of stored expendable [paragraph 0074 and Abstract], the expendable container comprising:

an expendable tank [container] configured to store the expendable [ink] and has a piezoelectric element actuator 106] attached thereto [as seen in figs. 1A-2; paragraph 0086];

a detection signal generation circuit configured to charge and discharge the piezoelectric element [with electrodes; paragraphs 0082 and 0141], and generate a detection signal including cycle information, the cycle information representing a cycle of an output voltage wave of the piezoelectric element after the discharge [from the residual vibration; paragraphs 0099, 0100 and 0142]; wherein

the cycle information is available for determining whether the residual quantity of the expendable is greater than a preset level [paragraphs 0087 and 0087; it detects whether the liquid is above or below a certain level].

Even though Tsukada et al. discloses a control module [861] configured to control the printhead operation [which include the charge and the discharge of the piezoelectric element], it does not expressly teach the following:

- Claim 1:

the control module is capable of varying a discharge characteristic of the piezoelectric element.

- Claim 2:

wherein the control module is capable of varying a discharge time constant of the piezoelectric element.

- Claim 3:

wherein the control module is capable of varying a discharge time of the piezoelectric element.

Takamura et al. discloses a CMOS drive circuit that drives a piezoelectric member as a capacitive element in an inkjet head. The discharge operation of the piezoelectric is controlled by the timing set by the circuit [Abstract]. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the Tsukada et al. invention to include means for controlling a discharge time of the piezoelectric element as taught by Takamura et al. for the purpose of setting a proper value at which desired operating speed, high reliability and low power consumption are achieved.

4. Claim 4 is are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsukada et al. (US 2002/0012015) in view of Takamura et al. (US 6,504,701) and further in view (US Patent 4,714,935).

5. Tsukada in view Takamura disclose the claimed invention as discussed above but fails to expressly disclose

“wherein the detection signal generation circuit comprises:

a voltage generation circuit configured to generate a predetermined potential difference between a first terminal with a higher potential and a second terminal with a lower potential;

the piezoelectric element having one end connected to the second terminal;

a charge control switch connected between the first terminal and the other end of the piezoelectric element, and configured to control on and off charging from the first terminal to the piezoelectric element according to a control output from the control module;

a discharge control switch connected between the other end of the piezoelectric element and the second terminal, and configured to control on and off discharging from the piezoelectric element to the second terminal according to the control output from the control module; and

a resistive circuit connected between the other end of the piezoelectric element and the second terminal, and having a variable resistance, wherein

the control module is configured to control the on-off of the charge control switch, the on-off of the discharge control switch, and the resistance of the resistive circuit.”

Yamamoto et al. teaches a circuit controlled by a control unit (as seen in fig. 9) that comprises a voltage source that causes a potential difference between components (positive and negative electrodes; col. 7, lines 21-35; as seen in fig. 7), a piezoelectric having one end connected to the second terminal (connected to ground), a discharge control switch connected between the other end of the piezoelectric element and the second terminal (35 in fig. 7), and configured to control on and off discharging from the piezoelectric element to the second terminal according to the control output from the control module (col. 7, line 21 through col. 8, line 6), and a resistive circuit connected between the other end of the piezoelectric element and the second terminal, and having a variable resistance (40 in fig. 7).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the control module in Tsukada in view of Takamura to include a piezoelectric connected to positive and negative terminals controlled by switches as taught by Yamamoto for the purpose of controlling the charging and discharging of the piezoelectric element and thus obtain improved results.

### ***Response to Arguments***

6. Applicant's arguments filed 10/16/2007 have been fully considered but they are not persuasive.
7. Regarding applicant's argument that Takamura "does not discuss providing a container for an expendable material that includes a sensor which detects an amount of the expendable material, much less that the control module does so by varying a

discharge characteristic of the piezoelectric element", please note that one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See in re Keller, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); In re Merck & Co., 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Additionally, please note that the examiner never disclosed that Takamura disclosed a container for an expandable that includes a sensor, just said that it would have been obvious to include the teaching of the control module in Takamura in the control module taught by Tsukada.

8. The same reasoning applies to applicant's argument that "Takamura discloses a CMOS drive circuit that drives a piezoelectric member, whereas Tsukuda discloses a sensing technique using a piezoelectric member" and thus there would be no motivation to combine the two. Takamura was cited to show that such circuit existed and, please note that it has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from the prior art apparatus satisfying the claimed structural limitations. *Ex parte Masham*, 2 USPQ2d 1647 (1987).

### ***Communication with the USPTO***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jannelle M. Lebron whose telephone number is (571) 272-2729. The examiner can normally be reached on Monday thru Friday 8:30am-5:00pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Luu can be reached on (571) 272-7663. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JML  
AU 2861  
01/06/2008



**MATTHEW LUU**  
**SUPERVISORY PATENT EXAMINER**